PII-151

3.5" Floppy Drive Controller
User Manual

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Edition 1.01

Checklist

Your Mini/Micro FDC package contains the following:

- One Mini/Micro FDC card
- One user manual

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Contents

Introduction

The Mini/Micro FDC is a floppy disk drive controller designed to be used in either IBM PC/XT® or PC/AT® personal computers and compatibles. The Mini/Micro FDC can drive a pair of 360KB, 720KB, 1.2MB or 1.4MB floppy disk drives in a variety of different combinations of either 3.5 inch drives, 5.25 inch drives or a combination of one 3.5 inch and one 5.25 inch drive.

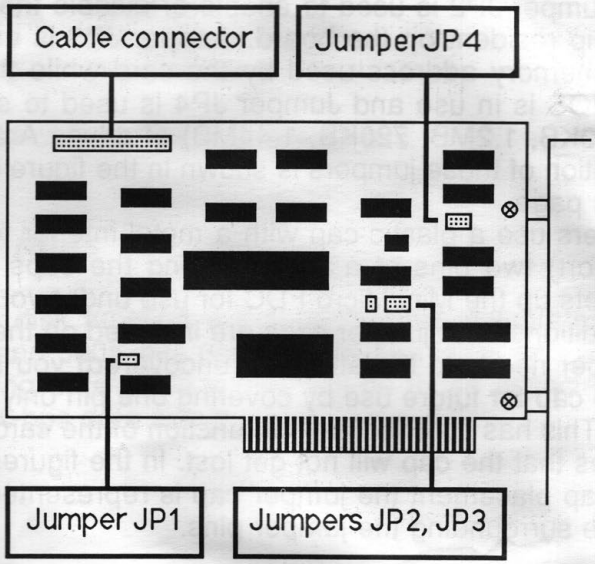
This manual contains information you will need to configure the card and set it up so that the mainboard recognizes the combination of drives you have chosen for your system.

The Mini/Micro FDC enables you to combine a conventional 5.25 inch drive with a 3.5 inch drive allowing you to take advantage of both disk formats. With the Mini/Micro FDC you can now have the reduced size and increased reliability of the 3.5" format while still having access to the large base of software available on 5.25 inch disks.

The clear, well-illustrated instructions in this manual ensure that even if you are a newcomer to the computer world, you will have the Mini/Micro FDC installed and running with a minimum of effort.

Card layout

The illustration below will familiarize you with the layout of the Mini/Micro FDC and the location of some components on the card that you will need either to configure or to connect things to.



Card setup

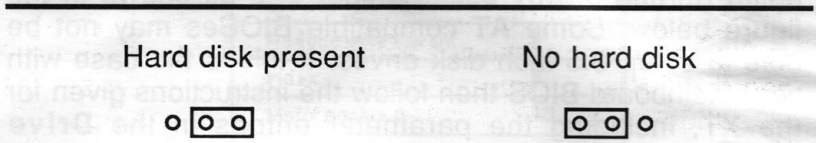
Jumper settings

On the Mini/Micro FDC there are four jumpers (a type of switch) which are used to configure the various settings required, depending on what hardware and BIOS will be used with the card. Jumper JP1 is used to allow simultaneous use of the Mini/Micro FDC with a hard disk controller. Jumper JP2 is used to enable or disable the ROM BIOS chip resident on the board. Jumper JP3 is used to set the memory address used by the card while the onboard BIOS is in use and Jumper JP4 is used to set the type (360KB, 1.2MB, 720KB, 1.44MB) of drives A and B. The location of these jumpers is shown in the figure on the previous page.

Jumpers use a plastic cap with a metal interior to connect (short) two pins at a time. Placing the caps as directed sets up the Mini/Micro FDC for use under your specific conditions. The jumper caps are included on the card. If a jumper needs to be left open (uncovered) you should save the cap for future use by covering one pin only of the jumper. This has no effect on the function of the card while it ensures that the cap will not get lost. In the figures illustrating cap placement the jumper cap is represented by a rectangle surrounding the jumper pins.

Jumper JP1

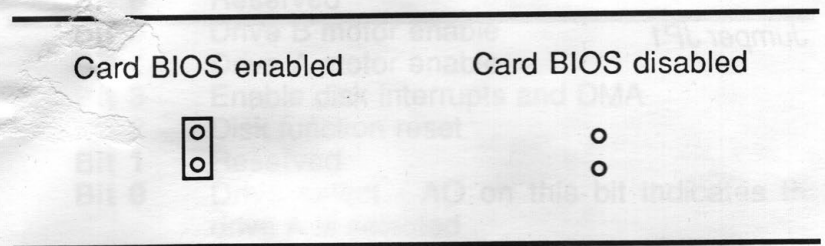
As mentioned, jumper JP1 is used to allow simultaneous use of the Mini/Micro FDC with a hard disk controller. This is primarily for use if you have an AT or compatible type system. If so, you must use JP1 to identify whether or not a hard disk and its control card are present in the system. Place a cap in accordance with your hardware configuration as shown in the figure below.



Jumper JP1

Jumper JP2

The Mini/Micro FDC can be used in either an XT or AT type system. The difference as far as the Mini/Micro FDC is concerned is whether the setup BIOS resident on the card is used or not. With an XT or compatible the ROM BIOS on the Mini/Micro FDC must be enabled. If the card is to be used in an AT or compatible the BIOS on the mainboard can be used to setup 3.5 inch disk drives or the onboard BIOS can be used. If the mainboard BIOS is used, the BIOS chip on the Mini/Micro FDC must be disabled (turned off) by using jumper JP2 as shown in the figure below. Some AT compatible BIOSes may not be able to setup 3.5 inch disk drives. If this is the case with your mainboard BIOS then follow the instructions given for the XT, including the parameter entries in the **Drive setup** section.



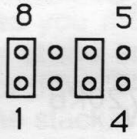
Jumper JP2

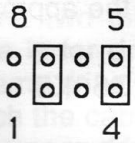
Jumper JP3

Jumper block JP3 sets the memory address the card uses on the mainboard when the Mini/Micro FDC's on-board BIOS is enabled. When purchased the Mini/Micro FDC is set for address number three as in the figure below. This setting should generally not require changing but if the address is already being used the card will not function properly. You will then need to try one of the other two addresses. One of the three will certainly work. Each address on the block is set with two jumper caps as indicated on the figure on the following page. The orientation of the block is as shown in the figure in **Card layout**.

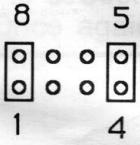
Address and Jumper settings

1: CA000H – CBFFFH 2: CC000H – CDFFFH





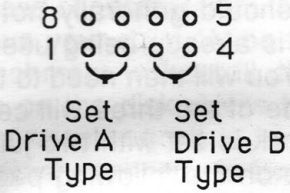
3: CE000H – CFFFFH



Jumper block JP3 settings

Jumper JP4

Jumper JP4 sets the type of Disk drives to run on Drives A and B. The four pins on the left set drive A while the four on the right set drive B, as in the figure below.



Jumper block JP4

To set either drive A or drive B the jumper settings will be as follows for the appropriate four pins:

 0 0 - 360KB

 1 0 - 720KB

 0 1 - 1.2 MB

 1 1 - 1.44 MB

Jumper block JP4 settings

Floppy Drive setup

XT and compatible systems

With the onboard BIOS enabled, after you have installed the Mini/Micro FDC in your system unit (see **Installation**) and set the jumpers properly as previously described, you will not need to enter any parameters when formatting any type of FDD.

The Mini/Micro FDC's onboard BIOS will drive any one of the following combinations of floppy disk drives:

(1) Two 3.5" FDD –

a) Two 1.44MB drives
b) Two 720KB drives
c) One 1.44MB drive, one 720KB

(2) Two 5.25" FDD –

a) Two 1.2MB drives
b) Two 360KB drives
c) One 1.2MB drive, one 360KB

(3) One 3.5"
– 1.44MB or 720KB
One 5.25"
– 1.2MB or 360K

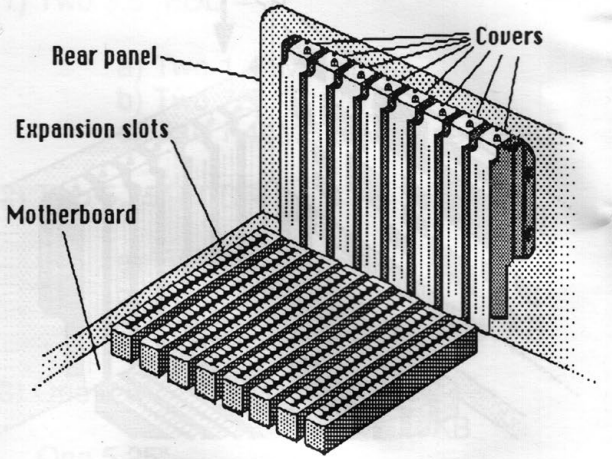
AT and compatible systems

When the Mini/Micro FDC is used with an AT or a compatible that has a mainboard BIOS which can set up 3.5 inch disk drives, you should use the mainboard BIOS setup program to set drives A and B before connecting the drives to the card. Having done this, the BIOS on the Mini/Micro FDC should be disabled and JP3 and JP4 settings are irrelevant.

Installation

Having ensured that the power to the system is switched **OFF**, refer to the user manual of your computer to open it up.

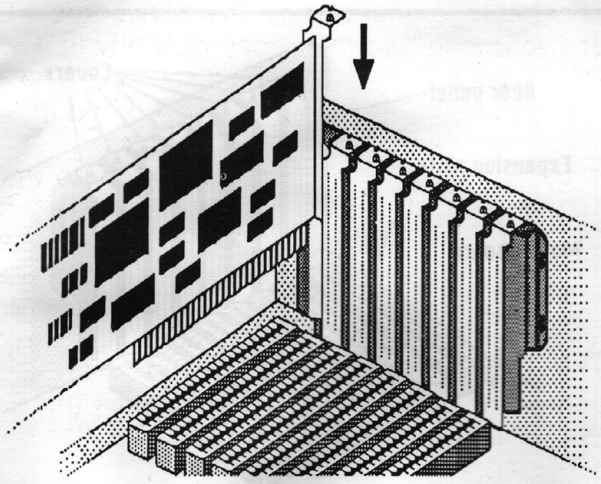
With a nutdriver or a small screwdriver (usually a Phillips head), remove the cover at the back of an unused slot. Keep the screw to attach the card to the case. Refer to the illustration below.



Expansion slots and slot covers

Before you install the Mini/Micro FDC in your computer, make sure the computer is unplugged, and then remove any static electric charge from your body by placing one hand on the power supply box inside your computer.

Pick up the card by its non-conductive edges. Avoid touching the connector contacts or any components with your hands as this could damage the card. Insert the card into an empty expansion slot as shown in the illustration below.



Expansion card insertion

Press the card firmly into the slot being careful not to exert excess force or torque the card. Attach the mounting bracket of the card securely to the rear panel of your computer with the slot cover screw you saved.

Connection to disk drives

The Mini/Micro FDC comes supplied with a daisy chained ribbon cable that is used to connect two drives to the card. One end of the cable has a single black female connector and the other has two in line on the cable. The single connector is attached to the Mini/Micro FDC and the other two connect to the floppy disk drives. One edge of the ribbon cable is marked with a red line. The red line side of the connector should be at Pin 1 when attached to the card. Pin 1 is clearly marked on the card.

When attaching the other two connectors to the floppy disk drives you must bear in mind two things. First, the connector at the end of the cable is for drive 'A' and the other is for drive 'B'. In most systems drive 'A' is the upper drive in the stack. When you attach the cable the end connector should therefore go to the upper drive. Second, as with the card end of the cable, it is important to be sure the orientation of the cable is correct otherwise the drive will not function properly. Once again, the Pin 1 side of the connector is marked by the red line.

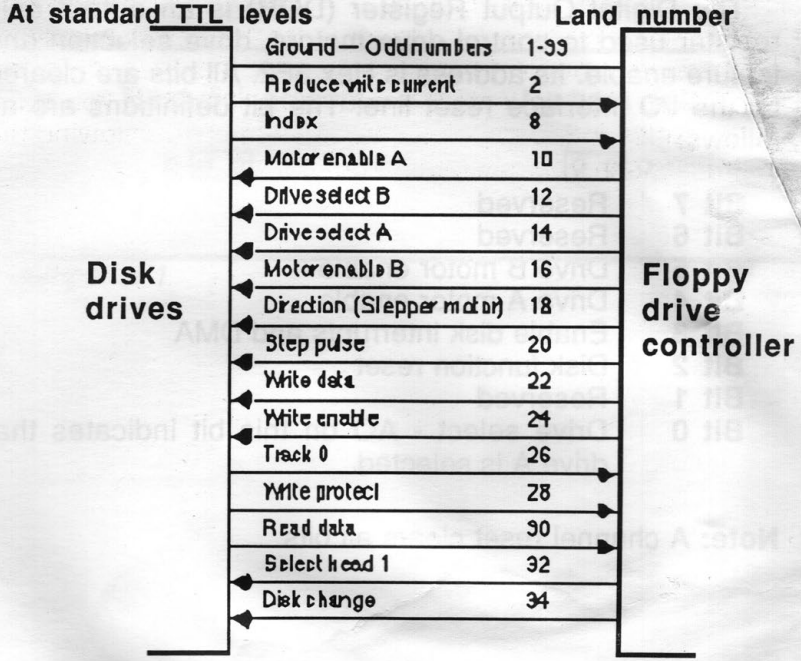
You can check the underside of your disk drives before you install them to note the position of Pin 1. If they are already installed, or you forgot to write down the position and can not remember it once the drives are in the case, a simple way to correctly orient the cable for most any drive is to attach it so that the red line is one the right when you look at the drive and connector from the front of the case. If you prefer to have your drive 'A' on top you can reverse the order of attachment without ill effect. There are two male connectors on the disk drives but only one will accept the cable connector so it is impossible to pick the wrong one. The other connector is for the power supply.

Once you have completed connecting the cable the Mini/Micro FDC is installed and ready to go. If you have nothing else left to do, close the system case following the instructions in your system manual.

Technical information

Interface pin assignments

The single cable interface to the disk drives carries both data and control signals. The signals and pin assignments are as follows:



The card is buffered on the I/O bus and uses the system board's Direct Memory Access (DMA) for record data transfer. An interrupt level is also used to indicate when an operation is complete and that a status condition requires microprocessor attention. The DMA request is level 2 and the interrupt is level 6 (IRQ6).

Digital output register

The Digital Output Register (DOR) is an output only register used to control drive motors, drive selection and feature enable. Its address is Hex 3F2. All bits are cleared by the I/O interface reset line. The bit definitions are as follows:

Bit 7	Reserved
Bit 6	Reserved
Bit 5	Drive B motor enable
Bit 4	Drive A motor enable
Bit 3	Enable disk interrupts and DMA
Bit 2	Disk function reset
Bit 1	Reserved
Bit 0	Drive select - AO on this bit indicates that drive A is selected

Note: A channel reset clears all bits.

Digital input register

The digital input register is an 8-bit, read only register used for diagnostic purposes. The following are bit definitions for this register:

Bit 7	Disk change
Bit 6	Write gate
Bit 5	Head select 3/reduced write current
Bit 4	Head select 2
Bit 3	Head select 1
Bit 2	Head select 0
Bit 1	Drive select 1
Bit 0	Drive select 0

Note: A channel reset clears all bits.

Data rates

The disk function will support three data rates: 250K, 300K and 500K bits per second. The 300K and 500K-bps incoming data pulse widths will be those associated with a 500K-bps data signal.

Disk controller

The disk controller has two registers to which the main system processor has access; a status register and a data register. The 8-bit status register has the status information about the disk and may be accessed at any time. The 8-bit data register (hex 3F5), actually consists of several registers in a stack with only one register presented to the data bus at a time. It stores data, commands and parameters, and provides disk drive status information. Data bytes are read from or written to the data register in order to program or obtain results after a particular command. The main status register may only be read and is used to facilitate the transfer of data between the processor and disk controller.

The bits in the main status register (hex 3F4) are defined as follows:

Bit 7 Request for Master (RQM) – The data register is ready to send or receive data to or from the processor.

Bit 6 Data Input/Output (DIO) – The direction of data transfer between the disk controller and the processor. If this bit is a 1, transfer is from the disk controller's data register to the processor; if the bit is 0, the opposite is true.

Bit 5 Non-DMA mode (NDM) – The disk controller is in non-DMA mode.

Bit 4 Disk Controller Busy (CB) – A Read or Write command is being executed.

Bit 3 Reserved.

Bit 2 Reserved.

Bit 1 Disk Drive B Busy (DBB) – Disk drive B is in the seek mode.

Bit 0 Disk Drive A Busy (DAB) – Disk drive A is in the seek mode.